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Agriculture, consist of descriptions of North American Chalcididæ from the collections of the U. S. Department of Agriculture and of Dr. C. V. Riley, with biological notes, together with a list of the described North American species of the family, by L. O. Howard. This paper will be followed by others, and will prove of great service to entomologists.—It appears from the observations of C. Aurivillius, reported in the *Entomologists' Monthly Magazine* for May, that *Eneis bore*, an arctic butterfly, requires two or more summers to complete its transformations; also that humble bees probably require more than one summer to mature.—At the meeting of the Entomological Society of London, held April 1st, Mr. R. M. Christy exhibited a drawing of the larvæ of the local form of *Platysamia columbia*, known as Nokomis; he had found the larva in Canada feeding on *Elæagnus argentea*, the peculiar silvery appearance of which was strikingly in accord with the color of the larva, which latter was probably protected thereby.—At a sale of beetles in London a pair of *Goliathus giganteus* realized £10 10s. 6d., and a pair of *G. albosignatus* £7 10s.; a pair of *Rhætus westwoodii* sold for £8, and a pair of *Rhætulus crenatus* sold for £2 10s.

#### ZOOLOGY.

SENSE OF COLOR AND OF BRIGHTNESS IN ANIMALS.—J. Graber has investigated the sense of color and of illumination in animals. To decide whether animals had a sense of light or of color he placed them in a box so arranged that qualitative and quantitative rays fell on one or other of its two divisions, which communicated with one another. Five mammals, seven birds, two reptiles, three amphibians, two fishes, three mollusca, twenty-seven insects, two spiders, and two worms were experimented with. It was found that the sense of color as well as the power of perceiving light was much more widely distributed among animals than has been generally supposed. The variations in the sense of color in various animals are very great, but a much greater number of observations must be made before a definite solution of the problem can be obtained.—*Journal of the Royal Microscopical Society, February, 1885.*

ARTIFICIAL DIVISION OF INFUSORIA.—Mr. Crisp at a late meeting of the Royal Microscopical Society called attention to some very interesting experiments by Dr. Nussbaum and Dr. Gruber on the artificial division of Infusoria. Dr. Nussbaum divided an *Oxytricha* into two halves, either longitudinally or transversely, and found the edges at the point of division were soon surrounded with new cilia. Notwithstanding that sometimes some of the body substance, or even a nucleus, was lost during the operation, the two halves became normal animals, with four nuclei and the characteristic ciliary apparatus. The head portion formed a new

hinder part, and the right half a new leg, The complete organisms thus formed again developed by spontaneous division. Simultaneously with Herr Nussbaum's experiments Dr. A. Gruber artificially divided *Stentor coerules* with the same results. If the divided parts of a Stentor were not completely separated they almost tore themselves apart, sometimes by rotating in opposite directions. If the cut was not very deep, monstrous forms might be produced, as, for instance, with two complete anterior or two posterior portions.—*English Mechanic*.

ORGANISMS IN ICE.—Professor Leidy relates that he had placed in his hands for examination, a vial of water obtained from melting ice which is used for cooling drinking water. From time to time, among some sediment taken from a water-cooler, his informant had observed what he supposed to be living worms, which he suspected were introduced with the water into the cooler, and not with the ice. Upon melting some of the ice alone, the worms were still observed, and the water submitted for examination was some that was thus obtained. Professor Leidy was surprised to find a number of worms among some flocculent sediment, mainly consisting of vegetal hairs and other débris. Besides the worms, there were also immature *Anguillulæ*, and a number of *Rotifer vulgaris*, all living. It would appear that these animals had all been contained in the ice, and had been liberated on melting. It was an unexpected source of contamination of drinking-water, that Professor Leidy had previously supposed to be improbable.

The worms were probably an undescribed species of *Lumbriculus*. Several dead worms swarmed in the interior with large, ovate, beaked, ciliated infusorians, measuring from 0.05 to 0.06<sup>mm</sup> long by 0.04 to 0.48<sup>mm</sup> broad.—*Journal of the Royal Microscopical Society, February, 1885*.

#### A FRESH-WATER SPONGE FROM MEXICO.—

*Myenia mexicana*, n. sp.—Sponge (as seen from an alcoholic preparation) green, minute, encrusting Lemna and other water plants.

Gemmulæ spherical, surrounded by a close series of berotulate spicules, embedded in a granular crust.

Skeleton spicules long slender, gradually pointed, smooth or very minutely microspined.

Dermal spicules wanting.

Berotulate spicules pertaining to the gemmules in length about three times the diameter of the rotules; shafts nearly cylindrical, sometimes more slender near the middle; irregularly spined; spines long acute. Rotules flat, deeply notched, rays irregular, acute.

This species, collected by Professor E. D. Cope in Lake Xochimilco, about seventeen miles south of the City of Mexico, differs from the familiar *M. fluviatilis* chiefly in the far greater length of the shafts of the berotulate spicules. It is further interesting as being only the second species of fresh-water sponge to reach the hands of specialists from that region of N. America. These particular specimens were probably collected in an immature condi-

tion, as suggested by the abundance of sarcode and the scarcity of gemmulæ or statoblasts; the single small group of these organisms alone rewarding a careful search through the whole mass of material sufficed to fix its generic position.—*Edward Potts.*

A HERMAPHRODITIC CRAB.—While conducting an exercise in zoölogy a short time ago using the common crab (*Callinectes hastatus*) I noticed one specimen having an abdomen intermediate in form between that of the normal male and female specimens. I at once inferred that it might be a case of hermaphroditism, which I think it is. The abdomen is triangular and except the terminal portion or telson is devoid of joints; the joints of the normal female abdomen being represented by indistinct lines. The abdomen was firmly imbedded in the plastron, it being evidently not within the animal's power to "open" it. The abdominal appendages resemble in general those of the female, although much more attenuated and having an undeveloped appearance. The fifth pair of pereopods lack the reproductive orifice in the basal joint found in the male; nor is the first pair of pleopods modified into copulating organs. The two little hooks fastening the abdomen into its groove are present; while there are only impressions representing the opening through the female plastrons for the expulsion of the eggs. When examined the internal organs were not in condition for a minute examination, still it is evident that neither male nor female organs were normally developed, as these organs were distinct in other specimens in similar condition, while they could not be found in this one.—*A. L. Ewing, New York, June 29, 1885.*

DISCOVERY OF BLIND FISHES IN CALIFORNIA.—At Santa Clara College in the San José valley is a flowing artesian well 170 feet deep, from which are discharged sightless fishes, from one to two inches long. I shall make arrangements to send specimens of these to Professor Baird, United States Fish Commissioner, who informs me that he has eighteen varieties or species of blind fishes from Eastern artesian wells; none have been secured from this coast.—*J. D. Caton.*

THE MULE DEER IN DOMESTICATION.—I find here three specimens of *Cervus macrotis* var. *californicus* in domestication, which have given me an opportunity of observing them not hitherto enjoyed. This variety of the mule deer I first discovered at Santa Barbara in 1875 and spent nearly a week in the mountains and procured specimens for mounting, which I sent to the Smithsonian Institution, and I first described them in *The Antelope and Deer of America*, p. 95. While they are a true *Macrotis*, the variety is very distinct, the enormous ear which induced Lewis and Clark, who first discovered them, to call them the mule deer is common to both varieties, but the ear on this new variety I now find is not

so uniform in size as in the Eastern or mountain variety. Of the three specimens now under observation, one, a male, one year old, has the largest and coarsest ear I ever saw on one of the species of that age, being eight inches in length; while the pair in the adjoining paddock, belonging to Mr. Palmer, are two years old, have ears seven inches in length, which are smaller than the average of the species, though still larger than those of *Cervus columbianus*, which has the next largest ear for the size of the animal of any of the American deer. In color, too, they are more variable than the mountain variety. The yearling specimen above described, belonging to Mr. Simmons, is of the dark gray color, so uniform in the mountain variety, from which no one would think of distinguishing it, but for the peculiar coloring of the tail, which is after all the most distinguishing feature of this variety from the other, and in these specimens is more pronounced than on the specimens procured at Santa Barbara.

In the mountain variety the entire tail is a yellowish white, except a jet black tuft at the end, while on the California variety there is a dark line extending on the top or upper side all of the way down to the terminal black tuft. In the Santa Barbara specimens this dark line down the tail was of the color of the coat above, while on these the dark line is black like the terminal tuft—at least this is the case with the yearling buck and the two year old doe, which are evidently of normal color. The two-year-old buck, however, is of a much brighter color than any other *Macrotis*, which I have seen. While it is not a white deer it approaches the white, the ears being the darkest, or nearest the normal color of any part of the animal. On the tail of this deer the dark line is much obliterated, but not entirely so.

That which distinguishes *C. macrotis* from all other deer is that the under side of the tail is naked to about the same extent as the horse's tail. This peculiar feature is observed on all of the specimens of both varieties to the same extent.

The habitat of *C. macrotis* is from the Missouri river to the Pacific ocean and from British Columbia to Mexico. So far as I have present information, this California variety occupies a region south of San Francisco and not extending east of the State line. I lack evidence to show that it is not confined to still narrower limits.—*J. D. Caton.*

THE GREEK AND THE MODERN FOOT.—It is well known that the Greeks represent the second toe as longer than the great toe in their statues, while in the modern European foot, the great toe is generally the longer. In this respect, as stated by Albrecht, the Greek foot is more quadrumanous than the modern. The antique statues generally represent the great toe as standing further from the second than is seen in the moderns. This might also be a quadrumanous character according to Schaffhausen, but Albrecht

thinks it is only the result of the wearing of the sandal strap. The reduction of the smaller toe Albrecht is disposed to ascribe to the wearing of shoes.

ZOOLOGICAL NEWS.—*Cœlenterates*.—Mr. S. J. Hickson (Trans. of the Roy. Soc., 1883) describes the ciliated groove which exists upon the ventral side of the stomodæum in many of the Alcyonarians. This groove, or "siphonoglyphe," which keeps up the circulation of water whilst the animals are retracted, is not present in the three genera of simple Alcyonaria, assumes more important proportions in these colonial forms (as Alcyonium, Spongodes, etc.), which have long body-cavities, is present in one of the two forms (the siphonozooids) of the dimorphic Alcyonaria (Pennatulidæ), and is absent in the Gorgonidæ, in which the solid axis occupies a greater bulk than the sarcosoma. The author works these facts into a new classification of the order, which he divides into (1) the Proto-alcyonaria, (2) the Stolonifera (Tubipora, Clavularia, Sarcodictyon, etc.), (3) the Pennatulida, (4) the Gorgonidæ, containing the Primnoaceæ, Gorgonaceæ, and other families without a siphonoglyph, (5) the remaining Alcyonarians (Cœlogorgia, Paragorgia, etc., with a siphonoglyph.

*Echinoderms*.—In the Philosophical Transactions of the Royal Society (1884), Mr. Herbert Carpenter describes a new crinoid from the Southern sea. This species, *Thaumatocrinus renovatus*, presents two characters found in no other Neocrinoid, but present in some of the older Palæocrinoids. These are the persistence of the oral plates of the larva in the adult, and the separation of the radials by interrarial plates. There is also a closed ring of basals on the exterior of the calyx, and a jointed arm-like appendage on the interrarial of the anal side. The example was dredged at a depth of 1800 fathoms. Like Eudiocrinus, it has but five arms, and is very small.

*Crustacea*.—Recent notes upon crustacea, by E. J. Miers, published in the Proc. Zoöl. Soc., London, include a list of thirteen decapods from the Mauritius, five of them not before recorded, from that island, and one, *Callianassa martensii* Myer, believed to be new to science.

Mr. F. Day (Proc. Zoöl. Soc., 1884) exhibited the skin and skeleton of a female *Acanthias vulgaris*, the whole of the flesh of which had been eaten out by the Isopod, *Conilera cylindracea*. About twenty examples of this crustacean, some of them one and a quarter inches long, were taken from the remains. Mr. Dunn, of Megavissey, who sent the specimen, remarked that in the summer months these lice are very abundant fifteen to twenty miles from land, generally on soft and sandy bottoms. He had taken one hundred dog-fish at once in a mullet-net, but nearly every one was found to have been eaten in a like manner. They devour a fish in a few hours, and hunt in large shoals. Congers and other

fish leave when they appear, but occasionally a shoal of bream will come and eat them up.

*Fishes*.—In the Proceedings of the National Museum Professor Jordan published a paper which includes notes by Mr. S. B. Meek on the types of North American freshwater fishes, found in the museum of the Philadelphia Academy. The latter display some deficiency of due caution, to say nothing of amenity, in dealing with the subject. Confidence in some positive identifications, and also some discoveries of error, will be much weakened by a knowledge of the fact that some of the specimens bear unreliable labels. These were placed upon them by a person employed for the purpose by the "authorities" of the Academy, who was totally ignorant of ichthyology, and not very well acquainted with the English or classical languages. At the time of the taking charge of the collection by this person, many of the specimens had not been distributed into separate bottles, and numerous labels were contained in each bottle. Of course they could not be attached to the correct specimens by the curator in question. Mr. Meek finds that the characters of one of the species were derived from "the shrivelled condition" of the type specimen. It is difficult to imagine where Mr. Meek obtained this information, as the specimen was in a perfectly fresh state when described several years before Mr. Meek was known as a student of the subject.

*Batrachians*.—Mr. G. A. Boulenger (Proc. Zoöl. Soc., 1884) describes eight new species of Batrachia from the Solomon islands, including the new genus *Ceratobrachus*.

The greater part of England is free from the croaking of the frog, but a croaking edible frog has for some time been found at several spots in Cambridgeshire and Norfolk. This form, usually thought to have been introduced from France and Belgium, has been shown by M<sup>r</sup>. G. A. Boulenger to be the Italian form, *Rana esculenta lessonæ*. Forty years ago the typical *R. esculenta* was turned out in great numbers in Norfolk, and examples have recently been taken. Though, when the whole Palæarctic range is considered, it is difficult to keep these forms apart, so far as regards England they are quite distinct. Indeed, if the genus *Pyxicephalus* of many authors is admitted, the form *lessonæ* would fall into it. There is no authentic record of the introduction of the Italian variety, but it was possibly done by the monks.

*Birds*.—Capt. G. E. Shelley (Proc. Zoöl. Soc., 1884) describes three new species of birds from the Kilimanjaro district, East Africa. These are *Muscicapa johnstoni*, *Nectarinia kilimensis*, and *Pratincola axillaris*. *Nectarinia reichenowi* (*Drepanorhynchus reichenowii* Fischer) is described and figured. The specimens came from heights of 5000 to 8000 feet.

Two examples of the American kestrel (*Falco sparverius*) are reported to have been seen in May, 1883, at Helmsley, in North-east Yorkshire, England, and the female was shot.

A new *Laniarius*, *L. lagdeni*, from Ashantee, has been described by Mr. R. B. Sharpe.

*Mammals*.—An examination of the uterus of the four-horned antelope, made by W. F. R. Welden, showed that it is divided into two compartments by a partition extending one inch into a passage internal to the os uterus. The Fallopian tubes are very small. The placenta is exactly intermediate between the completely diffuse one of *Moschus*, and the complexly cotyledonary apparatus of the sheep, for example, on the other. Each foetus has twenty-two to thirty cotyledons.

The lesser koodoo (*Strepsiceros imberbis*) differs from *S. kudu*, not only in its smaller size, but in the absence of the fringe of long hair down the neck in front, and in the much more compressed spiral of the curvature of the horns. Mr. Holmwood, British Consul at Zanzibar, states that it occurs on the Juba river, exactly under the equator, in groups of three or four. A stuffed example from Somali land is in the British Museum.

#### EMBRYOLOGY.<sup>1</sup>

ON THE AVAILABILITY OF EMBRYOLOGICAL CHARACTERS IN THE CLASSIFICATION OF THE CHORDATA.—The development of a median axial cord, differing essentially from cartilage, and which seems to arise from a strand of cells constricted off longitudinally from the upper side of the hypoblast and having the same or almost the same extension anteriorly and posteriorly as the nervous cord, at once distinguishes all embryo and primitive Chordata from all other types, and justifies the substitution of the latter term for the older name, Vertebrata. It is obvious that the term Chordata is a more applicable one for the reason that there are forms which never develop vertebræ, while there are none in this series which fail to develop a notochord at some stage, having the antero-posterior extension described above. The name Vertebrata, therefore, carries with it implications which are not justified by facts. Lankester insists for this reason that the term Vertebrata be abandoned, and that the word Chordata be substituted for the name of the phylum, so as to express a fundamental truth in scientific taxonomy.

It has been insisted that embryological data are not available for the purpose of discriminating classes, subclasses, etc., and, judging from the more or less unsatisfactory attempts made to arrange the Chordata on a purely embryological basis, this opinion has not been without foundation. The following notes are not so much intended to bring a new system to the notice of naturalists as to arrange some of the data of embryology in what seems to the writer a rational order. While it must be admitted that our knowledge is still imperfect in relation to the develop-

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